

Development of Multivitamin/Multielement Dietary Supplement SRM and SRMs to Assess Nutritional Status

NIST is working with the National Institutes of Health Office of Dietary Supplements (NIH/ODS), the U.S. Department of Agriculture (USDA), and the Centers for Disease Control and Prevention (CDC) to develop an analytically substantiated dietary supplement ingredient database (DSID) and to enhance the accuracy of nutritional status data in the National Health and Nutrition Examination Survey (NHANES). The initial DSID focus is characterization of vitamin and mineral supplements. As part of this effort, USDA will contract with analytical laboratories for analyses of dietary supplements available in the marketplace. NIST is producing a Standard Reference Material to be used as an analytical control in this study.

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NIST is producing Standard Reference Material 3280 Multivitamin/Multielement Tablets for use as a control by laboratories making vitamin or element measurements in similar types of dietary supplements. In cases where higher-order analytical methods were not already available at NIST, such methods (e.g., isotope dilution liquid chromatography with mass spectrometric detection (ID LC/MS)) have been developed for use in characterizing this SRM. In addition, NIST is producing several serum-based reference materials with values assigned for various vitamins (e.g., D, B₆, B₁₂, folate) to support NIH and CDC activities.

SRM 1955 Homocysteine and Folate in Human Serum is currently available. Homocysteine is a risk factor for heart disease, and folate counteracts effects of homocysteine. Folic acid has also been shown to reduce the risk of neural tube defects in fetuses. Both NIST and CDC provided certification measurements for this SRM.

The higher-order methods developed for analysis of SRM 3280 will be modified if necessary and used for characterization of the remaining serum-matrix materials. Procurement of material for SRM 972 Vitamin D in Human Serum is underway, and plans are being made for a serum material with values assigned for vitamins B₆ and B₁₂. Values in these serum-matrix materials will be assigned using a combination of NIST data, including data from higher-order methods, and data provided by collaborating laboratories.

Characterization of SRM 3280 Multivitamin/Multielement Tablets is nearing completion. Certified and reference values will be assigned for the 18 elements and 15 vita-

mins/carotenoids listed on a typical multivitamin/multielement dietary supplement label. A combination of results from two independent methods employed at NIST, including higher-order methods, as well as results from USDA and European laboratories expert in the measurement of vitamins will be used for value assignment of vitamin and element concentrations in this material.

USDA and NIH will use the multivitamin SRM to support on-going and proposed measurements of vitamins and elements in multivitamin dietary supplements. Dietary supplement manufacturers will also use this SRM as a control material for quality assurance of measurements so that label claims for their own products are accurate; other analytical laboratories will use the material for quality assurance and method validation.



As database and product label information become more accurate, researchers will be better able to accurately estimate vitamin and element intakes from dietary supplements. The serum-based SRMs with values assigned for vitamins are necessary to ensure that clinical vitamin measurements are reliable and that patients are provided with appropriate treatments when necessary. These SRMs will be used by the clinical chemistry community and by manufacturers of in vitro diagnostic devices to provide measurement traceability.

SRM 1955 Homocysteine and Folate in Human Serum is now available.
SRM 3280 Multivitamin/Multielement Tablets is nearing completion and will be available shortly.
SRM 972 Vitamin D in Human Serum is underway.